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INSTITUTE

COLONY OF THE GAMBIA

THE REPORT

OF THE

DEPARTMENT OF AGRICULTURE

For the Period ending 31st May,

1938

Price: Two Shillings

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1938.

The Report of the Department of Agriculture, for the period ending 31st May, 1938.*

SECTION 1. AGRICULTURE IN THE COLONY AND PROTECTORATE.

A. Meteorology.

1. The Rainfall was abnormally low and irregular throughout the country except in the middle river where the recorded rainfall at Yoroberi-kunda shows an increase of over seven inches above last year.

2. Satisfactory planting conditions in the coastal and lower river areas did not occur until the second week in July.

3. In the middle and upper river areas planting conditions were satisfactory up to June 20th when a drought lasting three weeks occurred causing delay in planting the groundnut crop and a check in the growth of the early planted corn, etc., crops.

4. The later rains were evenly distributed and, except for the middle river, the records were below the 1936 records.

5. The Rainfall Records for the five principal recording stations are given in the following table. The 1936 records are included for comparison. The areas in which the recording stations are situated are :—

Bathurst and Cape St. Mary	Coastal Area
Kerewan	... Lower River ,,
Yoroberi-kunda	... Middle ,, ,,
Wuli	... Upper ,, ,,

6. Rainfall Records—1936 and 1937.

Month.	Bathurst.		Cape St. Mary.		Kerewan.		Yoroberi-Kunda.		Wuli.	
	1937	1936	1937	1936	1937	1936	1937	1936	1937	1936
June	1·89	2·79	0·91	4·08	1·85	6·53	6·48	4·01	4·48	10·15
July	6·01	11·41	6·69	11·70	5·42	10·62	9·67	7·44	9·91	7·64
August	13·89	28·95	18·93	25·39	9·61	24·68	18·19	19·56	13·75	24·23
September ...	13·71	19·95	11·55	12·37	11·39	11·76	10·77	7·43	7·70	9·76
October	3·85	3·09	2·49	2·71	4·04	3·53	4·06	5·19	4·31	5·30
November ...	0·02	0·61	0·03	0·67	Nil	1·07	Nil	0·71	Nil	0·10
December ...	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
1938.										
March	Trace	—	Trace	—	Nil	—	0·28	—	0·53	—
April	Nil	—	Nil	—	Nil	—	Nil	—	—	—
May	0·40	—	0·14	—	0·50	—	0·94	—	1·22	—
Total ...	39·77	66·80	40·74	56·92	32·81	58·21	50·39	43·84	41·90	57·18

* In this report all weights and measures are according to the British standard. See footnote to table on page 15.

7. The records of the Four Temperature Recording Stations for the years 1936—37 are :—

Month.	Bathurst.				Cape St. Mary.				Yoroberi-kunda.				Wuli.			
	1937		1936		1937		1936		1937		1936		1937		1936.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1937.																
June	87·6	73·2	86·9	73·3	91·5	67·9	88·6	75·2	95·4	74·6	95·4	74·8	96·8	76·3	95·2	65·8
July	86·1	72·7	85·6	72·6	87·8	73·4	85·2	64·0	90·1	72·7	87·8	71·8	89·9	74·5	89·0	74·3
August	86·0	72·0	84·2	70·6	86·1	74·8	84·7	73·3	87·5	73·5	85·2	70·4	87·7	74·8	86·6	73·4
September ...	89·5	74·5	85·5	70·9	86·8	72·9	87·0	78·7	87·9	72·2	86·9	71·2	87·4	73·9	87·6	73·6
October	86·8	70·3	87·6	73·2	80·8	74·5	86·0	73·4	90·4	72·4	92·6	74·1	90·3	73·9	91·6	74·7
November ...	83·3	70·4	86·2	70·1	90·0	71·5	87·3	70·8	94·5	65·9	91·7	64·2	94·2	67·8	91·0	67·7
December ...	81·0	66·4	84·5	65·9	88·1	61·4	87·2	66·6	89·6	59·1	91·2	59·8	92·7	57·5	93·0	58·9
1938.																
January	79·4	62·0	83·1	62·3	86·1	62·4	85·8	63·1	91·4	61·5	92·1	58·7	90·5	57·0	93·6	56·4
February	81·2	63·3	86·1	62·1	82·7	63·1	88·5	65 8	101·6	63·3	99·3	59·9	101·1	100·5	100·3	56·8
March	88·0	66·5	82·3	65·9	84·6	67·6	86·6	62·8	95·0	70·1	102·6	66·4	97·9	69·5	103·0	69·0
April	93·3	64·1	80·5	64·9	81·2	66·8	82·2	59·8	103·8	68·2	103·5	70·3	103	73	104·3	72·9
May	90·6	68·7	84·0	67·7	84·1	71·0	89·1	62·7	99·6	74·1	102·3	73·3	102·7	76·3	103·7	76·5

(The temperatures are mean figures).

8. The records of the Four Humidity Recording Station for the years 1936—37 are :—

Month.	Bathurst.		Cape St. Mary.		Yoroberi-kunda.		Wuli.	
	1937	1936	1937	1936	1937	1936	1937	1936.
June	64	68	89	64	64	68	38	61
July	72	76	72	89	75	80	80	82
August	76	80	76	75	80	89	87	84
September ...	80	76	80	80	85	80	84	80
October	72	72	71	77	76	75	80	73
November ...	64	56	57	56	56	50	64	67
December ...	53	50	39	56	44	41	48	47
1938.								
January	40	45	30	40	38	32	33	29
February ...	55	53	52	53	27	29	40	32
March	53	59	63	63	45	38	34	46
April	59	67	63	70	41	66	43	43
May	60	63	57	71	49	43	55	44

B. Agricultural Crops, Etc.

(a) *Export.*

9. *Groundnuts.*—Some districts were reported to have increased the area under this crop, others planted increased food crops and on the balance the acreage of groundnuts was less than last season.

10. Propaganda to plant the seed early in the season was nullified by the drought period at the end of June and early July.

11. The lowered standard of quality of last season's crop caused anxiety to Government and Merchants alike. The serious position was explained to the African Farmers and every effort made to improve the standard of this season's crop. The result on the whole has been satisfactory.

12. The Native Authorities undertook to pass and enforce certain orders regulating the date of harvesting, staging, stacking, and drying and rain-saturation precautions.

13. The result of these orders, in the districts where they were enforced, has been marked and the quality of the crop has been the best recorded for many years. Certain districts notably Lower Niumi, Upper Niumi and Jokadu in North Bank Province and Eastern Jarra in South Bank Province, did not enforce the orders. The two Niumi and Jokadu Districts allowed the plants to be stacked on the ground resulting in the 'sweating' of the crop and a high percentage of mouldy and bad kernels. Eastern Jarra district, owing to the absence of the district Chief commenced pulling the nuts at an earlier date than the appointed date and a poor quality nut resulted.

14. The analysis figures supplied by the United Africa Company on their early shipments of this season's nuts point to a new low adulteration record in all items except excess shell which is slightly higher than usual. This higher figure for excess shell does not appear to be due to empty shells but to a heavier and thicker shell.

15. The average analysis figures of the first four shipments of this season's nuts shipped by the United Africa Company are :—

Dust	0·616%
Foreign Matter	0·719%
Excess Shell	1·041%
Bad Kernels	0·649%

16. The outstanding adulterations that have been noticed in the buying centres this season are plant refuse and lumps of dirt which are too large to be eliminated by the screens. These have caused considerable trouble with the African buyers.

17. A further point not covered by legislation is the confiscation of insect ridden nuts. A case occurred at Jowarra in the North Bank Province where a considerable stack of nuts stored from last season's crop became heavily infested with brucid beetle and water-saturated with storm-water. The whole heap became rotten but no action could be taken and the nuts were disposed of.

18. A stack of some 20,000 tons of nuts was stored at Kuntaur during the dry season. The analysis of the shipments showed a slightly better average than the shipments made before the rains. A little trouble with brucid beetle was experienced on the top of the stack but the infestation was confined to a very small area. The greater part of this tonnage was stacked in the open on a cement base and covered with tarpaulines, the whole of the rainy season.

19. *Palm Produce.*—The export figures of palm kernels for 1937 are the highest recorded for over twenty years and for the second time they have exceeded 800 tons.

20. The propaganda undertaken in connection with the production of a cleaner product was continued during the period under review.

21. Difficulty is still being experienced in getting the producers to market a clean product. Even higher prices offered by one firm failed to attract attention.

22. The principal adulterant is shell adhering to the kernel and is caused through nut-cracking operations being undertaken before the shell is dried properly.

23. This adhering shell appears to be a deliberate adulteration on the part of the producers. Commercial buyers do not insist upon a clean product and no legal action can be undertaken as the adulteration of produce, other than groundnuts, is not covered by the Ordinance.

24. Samples of palm produce taken recently show

Pericarp 27% (Oil 19% Fibre 8%)
Kernel 22%
Shell 51% (by weight).

25. A considerable quantity of palm produce is left uncollected in the bush each year. An attempt is being made to eliminate this waste by introducing hand machinery for cracking the nuts. The commercial firms have been interested in the scheme and they are providing the machines for a trial.

26. The majority of the palm produce is collected by strangers from the neighbouring French and Portuguese territories who come for the season and return to their own country as soon as the rains begin.

27. There was an import of some 72,000 gallons of palm oil during 1937. Much of this import could be produced in the country if the whole of the produce was collected from the bush.

28. Palm kernel oil is manufactured in large quantities for local consumption.

29. Two small plantations of 500 wild palms were planted at Kerewan and Kintikunda, North Bank Province at the end of the rainy season. Owing to the abnormally low rainfall at these places the site of the plantations dried out and the majority of the palms died during the dry season. A further planting will be undertaken during the coming season.

30. The labour in collecting and planting these two plantations was undertaken voluntarily by the people of the two villages concerned. Neither of these villages have Oil Palms growing in the vicinity.

31. *Beeswax.*—Exports show a slight increase on the 1936 figures.

32. Efforts have been made to interest the producers in the marketing of a cleaner product. In the Middle River Area a small number of producers brought rough wax to the departmental headquarters to be shown clarification methods. The price of 9d. per lb. obtained for the clarified wax was satisfactory to them. The principal producers who approached the Department to be shown the clarification methods were from the neighbouring French Territories.

33. The United Africa Company offered the special price of 6d. per lb. for untreated 'Honey' wax, as against 2d. per lb. for 'Brood' wax, and it is hoped that increased quantities of this wax will be offered in the future.

34. Experiments are being carried out to produce a double chambered bee-skep with a Queen excluder to adapt the African skeps for the production of honey and honey-wax in greater quantities and to prevent the present wholesale destruction of the swarms when honey is being collected.

35. A sample of clarified wax prepared by African Producers was sent to the Imperial Institute for analysis and report. The analysis and extracts of the Report form an appendix to this report.

36. *Shea.*—Throughout the country at all District Chiefs' villages small plantations of shea trees have been planted for experiment. The seed was obtained from Nigeria and arrived at a date when full advantage of the rainy season could not be obtained.

37. The seed was planted by departmental officers, four seeds being planted to each peg. Germination has been erratic. The plantations have been visited by the departmental officers from time to time and the Chiefs advised of the necessary attention required.

38. The majority of the plantations were fenced and in some cases the individual trees guarded to protect them from animal damage. Little or no attention was paid to the plantations by the Chiefs or the people with the result that the majority of the seedlings have perished, principally through the browsing of the village goats and sheep.

39. The people though not familiar with the tree know the shea butter product well and if the Government are to develop the crop greater interest and co-operation are essential.

40. Seedlings in the Nursery at Cape St. Mary have flourished with little or no attention for a period of three years and at the end of the period under review were some eighteen to twenty-four inches above ground and with a stem an inch in diameter.

41. The small experimental plantation at Yoroberi-kunda showed a 66% surviving 'pegs' at the end of the period under review, against an average of 19% in the village plantations throughout the country.

42. A table of plantings and numbers of trees surviving at the end of the period under review is given as an appendix to this report.

(*b*) *Food Crops, Etc.*

43. *General.*—Food crops produced satisfactory yields generally. In certain areas the drought of June and July caused a check in the growth of the early sown food crops, but the effect did not cause any serious shortage.

44. In the Upper River Province some damage was caused through locust invasion and all available seed at the Wuli Agricultural Station was issued to the farmers of the areas concerned.

45. The Department continued the issue of selected rice seed, cassava, maize and guinea corn in many districts.

Demands for seed of okra, setaria and vine cuttings of imported sweet potatoes were greater than the supply.

46. Commissioners of the Provinces carried out propaganda for the growing of fruit trees in the villages. Many orange and mango plants are being distributed throughout the country as a result of this propaganda.

47. Arrangements have been made for extensive plantings of orange trees throughout the Kombo districts with a view to supplying the demand for this fruit. It is hoped that some 8,000 orange trees will be distributed during the coming rainy season.

48. In the districts adjoining the Agricultural Headquarters at Yoroberi-kunda and the Irrigation areas at Dunyajoe there has been a marked increase in the amount of rice grown by the people. The imported variety of 'Guiana Creole' and 'Hill Paddy' were prominent in the plantings.

C. Produce Inspection.

49. *General.*—Shortage of staff has precluded regular and complete inspection of produce. Nevertheless a wide field of inspection has been undertaken during the year and a general improvement of the produce has been evident.

50. The produce inspection undertaken comes under the following classifications :—

Groundnuts and Palm Kernels—

(*a*) inspection of crop during harvest ;
(*b*) inspection of consignments offered for sale at the buying centres ;
(*c*) inspection of buyers stacks after purchase ;
(*d*) inspection of consignments in transit from buying centres to exporting ports ;
(*e*) inspection of consignments loading for export.

Beeswax—

(*a*) inspection of wax during collection and at producers yards ;
(*b*) inspection of parcels offered for sale at buying centres.

Hides and Skins—

(*a*) inspection of flaying and slaughtering ;
(*b*) inspection of drying ;
(*c*) inspection at exporting centres (Bathurst) ;
(*d*) inspection of arsenication (Bathurst) ;
(*e*) inspection after arsenication.

51. *Groundnuts.*—With the limited staff available the department was unable to supervise completely the inspection of the groundnut crop throughout the country but every available officer was seconded for this duty.

52. In the South Bank Province the forestry messengers, recently appointed by the Native Authorities, assisted with the inspection and rendered valuable service in the Kombo districts.

53. If the high quality of the groundnut crop obtained this season is to be maintained the interest and co-operation of all District Chiefs and Village Headmen is essential to enforce the Native Authority Orders until the operations become a matter of normal routine to the producers.

54. The inspection of village groundnut seed stores was undertaken to ensure that seed for planting was of a good quality. Many villages throughout the country have paid little attention to the seed in the stores. In some cases mouldy nuts, in others unwinnowed nuts containing large quantities of plant refuse, empty shells immature nuts and soil were accepted.

55. *Palm Kernels.*—During visits to the palm produce areas the inspection staff gave demonstrations of improved methods of drying and cracking palm nuts.

56. Consignments of produce offered for sale in Bathurst and Kombo buying centres have been inspected and excess adulteration checked by advising the vendors to hand-pick the produce before selling.

57. *Hides and Skins.*—Inspection of hides and skins has been undertaken in the principal centres where the improvement scheme has been inaugurated but regular inspection has been impossible. Inspection of hides and skins at Bathurst shows that knife scoring and improper drying are still occuring, the former being due to the use of pointed knives in flaying and the latter to removal of hides and skins from the frames before drying is completed.

58. *Beeswax.*—Inspection of beeswax offered for sale in Bathurst and Kombo has been undertaken with a view to helping the producers to obtain a better price for the wax by separating the 'Honey-wax' from the 'Brood-wax'.

59. Demonstrations in the clarification of beeswax have also been undertaken.

D. Forestry.

60. This subject has received the attention of the Government. The planting of shea nuts experimentally in all districts is a prelude to its adoption as a possible adjunct to general forest policy.

61. Burning of the 'Bush' is undertaken haphazardly throughout the country and at a time when the greatest damage to the young growth of the trees is caused. Hills become denuded of ground vegetation, valuable vegetative material for soil humus is totally destroyed and erosion of soil by storm water is unchecked during the rains.

62. Forest conservation is a difficult problem in this country. Neighbouring territories are divided by an imaginary line through the bush ; hunters, migrant farmers, traders and others camping by the road and path sides set alight to the bush and cause extensive damage over large areas.

63. Some Native Authorities issued orders for the burning of the bush lands within a period of two months of the end of the rains. Where these orders were carried out some conservation was effected. In others, where conservation was to be effected by allowing unchecked growth of vegetation, fires from various causes destroyed more vegetation owing to the fierce heat generated during the burning of the dry material.

64. A committee to advise Government on Forest Policy was appointed by Government at a meeting of the Legislative Council on the 16th of March, 1938. The Members of the Committee are :—

The Senior Agricultural Superintendent,	Chairman.
The Honourable Mr. R. G. Biddulph,	Member,
,, Sheikh Omar Fye,	,,
,, Mr. L. de V. Bottomley	,,

Owing to the absence from the country of the Chairman on leave, and the coming departure on leave of the remaining Members no meeting of the Committee was convened during the period under review.

E. Livestock.

a. General position.

65. Livestock in the Gambia occupy an important position in the life of the people but the development of the livestock industries has not been organised until recent years.

66. The livestock types compared with those of other West African countries are good.

67. The various types have been evolved to suit the local conditions both natural and artificial. The cattle, goats, sheep, pigs and poultry are all heterogenous types evolved from the original breeds by crossing with neighbouring breeds, especially those of the Senegal in the North.

68. This movement from the North must have been intensified during the long period that the River Gambia was the main trade route and has been continued to the present time through the movement of trade stock to supply the demands of the countries south of the Gambia.

b. Cattle.

69. Cattle are to be found in all districts throughout the country from the coast to the farthermost inland boundary. The general conditions are similar to those of the settled Fulani in the Kano Province of Northern Nigeria.

70. Ownership is confined to small numbers and arable farming is practised but the animals are not incorporated in the general farming economy.

71. The owners are not dependent upon the dairy products for sustenance. The cows are milked for immediate family requirements only and little or no exchange of dairy for farm produce is possible owing to the lack of organised village markets.

72. Sour milk is preferred to fresh milk, the local name is 'Nono' as in the Hausa language of Nigeria, but this milk may or may not include the cream.

73. Butter is made in small quantities if and when it is required and a form of preserved butter is made, which is locally known as 'cooked butter.' The preparation of this cooked butter is interesting as it is the first recorded case of Ghee being made direct from the ripened cream instead of from butter.

74. During the rainy season the low-lying lands adjacent to the river and creeks are inundated with flood water and the herds have to move to the higher ground. The movement is local and does not involve trekking beyond a few miles from the villages.

75. The swampy ground provides good succulent grazing when the flood waters have receded and this, with browsing on the young shrub and tree growths provides good nutritive feeding throughout the most difficult period of the year.

76. Conservation of fodder is not practised for cattle but they are allowed to feed on the crop residues after the corn has been harvested and the groundnuts threshed.

c. Types of Cattle.

77. The four principal types of cattle in the Gambia are:—

i. The Gambian Shorthorn
ii. The West African Shorthorn, both of the *Bos brachyceros* type
iii. The Hamitic, *Bos primigenius* type and
iv. The Zebu, *Bos namadicus* type.

78. The Gambian Shorthorn predominates, the West African Shorthorn is prevalent, the Hamitic is to be found in localised groups and the Zebu is only to be found in the slaughter pounds of Bathurst and the bigger trading centres.

79. The influence of the Hamitic type is apparent throughout the country and the cross bred Zebu is to be found along the trade routes where the slaughter cattle are allowed to breed with the local animals.

80. The Zebu cross-breds are not favoured as they are not resistant to trypanosomiasis as the other breeds are.

81. In conformation the Senegal Zebu is similar to the Sokoto breed of Nigeria but the colour variation is greater ranging from white through the predominating colours of fawn and dun to red and black. Self colours predominate over the mixed ones.

82. *The Gambian Shorthorn.*—In appearance the Gambian Shorthorn is like a small British Shorthorn, the bulls favour the Swiss Simmenthal or Brown Swiss breeds. The type is a dual-purpose one favouring the dairying type. The predominating colour is brown or fawn, the skin pigmentation amber.

83. *The West African Shorthorn.*—Is a similar type to the Gambian Shorthorn but smaller and the predominating colour is black with black skin pigmentation. The strain is similar to the Panyam strain of the Plateau Province of Nigeria. It is most prevalent along the South Bank of the River Gambia which points to its movement from the South.

84. *The Hamitic.*—This type favours the 'beef' type. In size it is a little bigger than the Gambian Shorthorn. In the males the neck is thick set and a suspicion of a hump is noticeable along the withers.

85. *The Senegal Zebu.*—This breed is a big-boned and altogether coarser animal. The principal differing feature from the other breeds is the hump. In cross-breds of the humpless breeds this feature remains dormant in the second generation at least. The cross-breds inherit from the sire the high susceptibility to Trypanosomiasis and only partially inherit the resistance to Rinderpest.

86. *Comparative Table of Breeds.*—A comparative table of the four types is given in Appendix V.

d. Goats.

87. Goats are kept in almost every compound in the country. With sheep they form the main source of fresh meat supply.

88. The individual flocks are small in numbers and average about four per compound.

89. The type of goat predominating in the Gambia is the Nubian. The predominating colour is brown or dun but all self and mixed colours are to be found. The skin is light, of fine texture, clear amber colour, good grain and weighs eighteen to twenty ounces in the dried state. The hair is short and fine. The head medium to long. The horns short and backcurved. The neck medium to long. Barrel is oblong in shape. The shoulders are well formed. The backbone is prominent. The ribs medium to well sprung. The hindquarters fairly square in shape. The udder small and compact. The meat is of fine texture and light in colour. The movement is active and the animals are good foragers.

e. Sheep.

90. Sheep are kept in every village throughout the country. They are used entirely for meat purposes and the demand is greater than the supply.

91. The type of sheep in the Gambia is a mutton type. The breed is a fairly pure one but along the trade-routes cross-breeding with the long-legged, Roman-nosed Senegal breed is very apparent.

92. The colour is white with black markings on head and black feet. All black sheep are uncommon. The skin is a clear amber colour with the visible mucous membranes and black hair areas of black pigmentation, and is suitable for glove leather. The hair is short and fine. The head small. The horns of medium length gracefully waved and amber or black in colour. The neck is short and stocky. 'Wattles' are common and are usually in pairs. The barrel is oblong with a prominent sternum. The shoulders are well-formed. The back straight and broad. The ribs well-sprung. The hips not prominent. The hindquarters fairly squared. The legs medium to short in length. The udder small and compact. The meat is fine in texture, light in colour and with very little fat.

93. The animals are resistant to trypanosomiasis but susceptible to streptothricosis.

f. Donkeys.

94. The chief uses of donkeys in the Gambia are for riding and for pack loading.

95. The breed is the small African Burro. Light silvery brown in colour with dark dorsal and shoulder stripes. The animals are sure footed, extremely docile and bear with much endurance heavy and bulky loads.

96. The animals are not carefully tended and feed around the villages hobbled with short fetlock rope hobbles.

97. Mule breeding is not practised.

g. Horses.

98. The horses in the Gambia are a degenerate type of Arab. Puny in size, weak bone and only used for hacking purposes. The number of breeding mares is small.

h. Pigs.

99. The type of pig is a bacon type, in conformation like a small Tamworth Breed. The colour is variable, black predominates, white, ginger and mixed colours are common. The snout is long and straight. The ears medium in size and pointed. The legs long. The barrel deep, medium breath, equally wide at the shoulders, sides and hams; top line straight and bottom line slightly curved. The back is medium to narrow; medium loin and long ribs. The shoulders are narrow to medium. The flank-girth is a little shorter than the heart girth. The sides are long, deep and straight. The hindquarters slightly drooping to the tail, medium depth. The hams are rounded, medium depth and thickness. The hair is long along the ridge of the neck from the withers to the poll, short on body and medium to fine texture. The skin is smooth. The movement active. The meat is medium to fine in texture. If housed and stallfed the gilts fatten quickly and show a good proportion of meat and fat, the colour of the meat is light to medium.

i. Fowls.

100. Fowls are kept in every yard in the country. They provide a ready source of meat supply and are used for blood sacrifices on ceremonial occasions.

101. The type is a dual purpose one and for a native breed is good. In conformation they are similar to the Anconas but smaller. Partridge colour and markings predominate. The birds are very active and alert. The hens make good sitters and tend the chickens in a most protective way.

102. The birds are housed in the dwelling huts or cooped into small huts of their own in the compound. No attention is paid to feeding, the birds have to forage for themselves around the huts.

103. Egg production is good for a native breed. Hens will lay regularly for twenty to thirty days before going broody. Eggs of $1\frac{3}{4}$ ozs. are produced by mature hens. The eggs are used for domestic purposes by both the men and the women and even in the remote parts are sold at $\frac{1}{2}$d. to 1d. each. The demand is much greater than the supply.

104. Table birds cost from 1s. to 1s. 6d.; a good bird will give a dressed weight of $1\frac{1}{2}$ lbs., the flesh is white.

j. Guineafowl.

105. Domesticated guineafowls are kept in most villages but the numbers are small. They are a good type and originate from the local wild guineafowl. They are good but seasonal layers and make excellent table birds. The dressed weight of a good bird is about $3\frac{1}{2}$ lbs., the flesh is white.

k. Ducks.

106. The only breed is the Muscovy and these are only found in larger towns in small numbers. Good table birds weigh about $2\frac{1}{2}$ to 3 lbs. dressed weight, the flesh is white.

l. Turkeys.

107. Turkeys are rare and are only to be found in a few of the bigger towns where there is a demand during the Christmas season.

F. Animal Health.

108. *General Position.* The general animal health is good. All the year round grazing and browsing is available.

109. The nutritional standard, resistance to parasitic disease, early sexual maturity, regular parturition and lactation are generally good.

110. No systematic improvement of stock has been attempted but small breeding herds of cattle have been commenced in recent years at two of the departmental experimental centres with a view to establishing pure bred animals, by selection, of local types. The type to be bred is the Gambian Shorthorn.

G. Animal Husbandry.

111. Conservation of fodder is not practised except in the case of the crop residues of groundnuts and the bran of guinea corn and millet for horses and 'charity' sheep.

112. Cattle are herded in the open. Kraal sites are provided where the cattle are tied to a stake by a horn rope. The sites are moved frequently to manure as great an area of farmland as possible.

113. Horses and donkeys are kept in the compounds. They are fed on the grasslands adjacent to the village.

114. Sheep and goats are housed at night and great care is often exercised in providing huts with raised floors. Ventilation is obtained by having the hut sides, and sometimes the floors, constructed of split bamboo cane.

115. Supplementary feeding of slaughter stock is not practised except in the case of sheep fattening for charity purposes when bran and corn are supplied.

116. No organised town or village markets exist, except at the biggest trade centres in the trade season and at Bathurst where there is a permanent market. The regular disposal and distribution of livestock products is therefore impossible and great wastage occurs.

117. *Census.*—A census of domesticated livestock is given in Appendix IV of this report.

118. A comparison with the 1933 figures is made. It was in 1933 that the Cattle Immunisation against rinderpest commenced. In the five years the cattle figures show an increase of 11,609. The increase should be more marked when the rinderpest immunisation is completed.

119. The sheep and goat census show a decrease of 8,349. The decrease in numbers is a serious one.

120. The decrease of sheep in South Bank Province is approximately twenty per cent. compared with the figures of five years ago.

121. The decrease of goats in the South Bank Province is approximately twenty-five per cent. over the same period.

122. The combined figures for sheep and goats in the other Provinces show decreases of 785 in MacCarthy Island Province and 3,335 in Upper River Province representing approximately five per cent. and twenty-three per cent. respectively and in North Bank Province an increase of 4,538 representing thirty-nine per cent.

123. The decrease in the three Provinces is difficult to account for and may be due to the cross-breeding with exotic strains producing offspring that are not resistant to the indigenous diseases and conditions especially trypanosomiasis and streptothricosis.

124. The increase in North Bank Province is probably accounted for by a more careful method of census taking and by a large influx of animals from surrounding territory to replenish the flocks.

125. No pig census is available. The swine population is a big one in the districts inhabited by the Jola peoples.

126. The increase in the number of horses is 107 representing an increase of seventeen per cent. in the five years.

127. The increase in donkeys is 185 representing approximately three per cent.

H. Diseases and Pests.

128. *Locusts* (Kuntingo).—Swarms of locusts appeared in the Upper River and MacCarthy Island Provinces in June. Hoppers appeared in July in the Upper River Province destroying some of the early planted maize and corn crops in several villages.

129. An extensive adult swarm was reported in North Bank Province travelling up and down the river bank from December to February. On two occasions portions of this swarm were blown across the river to South Bank Province with the high winds.

No extensive damage to crops was experienced.

130. *Rosettee* (Tio Jankaro).—The irregular and abnormally low rainfall caused late plantings of groundnuts and in these late plantings Rosette disease was noticed. The disease in most districts was not serious but in the Lower and Upper Niumi and Jokadu Districts of North Bank Province some farms were abandoned on account of the infestation.

131. *Striga* (Silo).—This parasite continues to be a major pest in all guinea corn farms. In many districts, and particularly in the districts of South Bank Province, orders for its eradication were made and enforced by the Native Authorities.

132. In many areas throughout the country guinea corn is not planted on account of the infestation of this parasite causing regular failure of the crop.

133. If the Native Authorities are prepared to continue the enforcement of the orders for the destruction of this parasite some control of the pest will be obtained but the indications are that the enforcement of the order is not welcomed by the chiefs or the farmers. The Kombo North District of South Bank Province has rescinded the order for the coming season.

I. Exports of Agricultural Products.

134. *Exports.*

The principal Agricultural Products exported for the years 1933 to 1937 have been :—

	1933.		1934.		1935.		1936.		1937.	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
	Tons.	£	Tons.	£	Tons.	£	Tons.	£	Tons.	£
Groundnuts ...	67,370	500,766	71,919	387,345	45,110	368,887	49,654	427,317	66,576 (undecorticated)	646,635
									508 (decorticated)	6,954
Palm Kernels ...	615	4,199	553	2,712	643	4,223	626	4,858	861	7,558
	lbs.		lbs.		lbs.		lbs.		lbs.	
Hides & Skins...	21,202	185	141,511	1,978	93,181	1,060	116,306	1,839	109,108	1,855
Beeswax ...	11,095	272	59,826	1,404	63,989	1,541	32,573	909	35,424	1,140

In this report the English long ton of 2,240 lbs. and bushel of 28 lbs. are used. All weights and measures are according to the British standard.

SECTION. II.

WORK OF THE DEPARTMENT.

J. Work in District.

135. For six months of the year under review only two European Officers were in residence in the country. For the last month this number was reduced to one. In consequence difficulty was experienced in giving attention to all the departmental activities of the districts.

136. *Ploughing.*—Supervision was given to ploughing in Upper River and MacCarthy Island Provinces. Demonstrations were undertaken in South Bank, North Bank and MacCarthy Island Provinces.

137. The demonstrations in the South Bank and North Bank Provinces aroused great interest amongst the people.

138. It is intended to continue the demonstrations in South Bank Province during the coming rains.

The demonstrations will emphasize the significance of the plough in the family farming unit.

139. In the North Bank Province four ploughing outfits have been ordered by the District Chiefs of the three Baddibu districts. Supervision of the ploughing and training of ploughmen will be undertaken during the coming season.

140. *Inspection and Propaganda Work.*—During the rainy season all available staff toured the districts in connection with shea nut cultivation and farming operations with groundnuts. Later produce inspection was the main activity.

141. *Irrigation.*—In North Bank Province Berrending and Medina Sering Mas in Lower Niumi District asked that areas for dry season planting should be laid out for the villagers.

142. Operations commenced at Berrending where the stream has been dammed; the water supply channel constructed; twenty-two flats levelled, bunded and cultivated; compost pits prepared and filled and two flats planted with rice.

143. At Dunyajoe Irrigation Area the villagers were given part of the departmental area to cultivate during the wet season. This was readily undertaken as the area was in a high state of fertility. During the dry season following a demonstration of minor agricultural and garden crops thirty-two women of the adjacent villages planted fifty-seven flats. Thirty of these flats were planted with rice and twenty-seven with minor crops including Capsicums (pepper), shallots, bitter tomato (solanum spp), tomatoes, sweet potatoes, coco-yams, etc.

144. *Manufacture of Agricultural Compost.*—The method of manufacture of compost from crop and plant refuse in the irrigation areas of the Lower River Provinces was modified to demonstrate preparation of quantities suitable for individual instead of communal needs.

145. *Groundnut Seed Replacement.*—As an experiment the groundnut seed in the village seednut stores within a radius of five miles from Kerewan, North Bank Province, was replaced with seednuts from Upper River Province, and Yoroberi-kunda experimental station in an attempt to improve the quality of the groundnuts of this area.

146. *Hides and Skins Improvement.*—Demonstrations and the training of butchers were continued with the help of the African personnel of the Veterinary unit during the rainy season when immunisation work was suspended.

147. *Citrus Plantations.*—Work has commenced on the preparation of the sites for the planting of seedling orange trees in plantations in the Kombo Districts. It is anticipated that 7,500 seedlings will be planted out in plantations ranging from twenty-five to 1,000 tress during the coming rainy season.

Co-operation.

148. *Co-operative Produce Marketing.*—A small co-operative unit was formed in the village of Busumbala, North Kombo District, South Bank Province for the sale of groundnuts.

149. The principal aim of the unit was to obtain a premium over the local buying price in return for the production of a high standard quality groundnut.

150. The unit was not formed until the major portion of the crop had been sold. The quantity handled was fifteen tons three hundred weights; the amount realised £60 13s. Expenses totalled £6 7s. 6d. for transport and hire of screen; the price paid to the producers was 10·73d. per weight bushel of twenty-eight pounds, a premium of about 1¼d. per bushel over the nearest buying centre price after deduction of expenses. The producers were quite satisfied with this return.

151. Apart from the better price the people considered this method had other advantages.

152. Whilst this co-operation does not fully conform to the co-operative ideal as a society, a useful start has been made. It is not yet known whether it will be possible to repeat the experiment on a larger scale next season—or if it will be possible to repeat it at all.

153. The attitude of the Chamber of Commerce to this co-operative experiment has not been very helpful.

154. Towards the end of the period under review rumours have been received that the villagers who sold their groundnuts co-operatively are being boycotted by the local shops in the matter of credit for this wet season. This is under investigation.

155. *Co-operative Purchase of Implements.*—Application was made to form a co-operative unit of four members at Sukuta, Kombo North District, South Bank Province for the purchase of an animal-draught ploughing outfit.

156. Owing to various delays and difficulties the matter has had to be postponed till next year.

Livestock.

157. *Disease Control.*—The only work in connection with disease control is the cattle Rinderpest Immunisation Scheme undertaken by the Veterinary Officer during his visits to the country for periods of about six months each year.

158. During the absence of the Veterinary Officer from the country control of Rinderpest has to be attempted by local quarantine orders. This control has not been a satisfactory one and outbreaks of the disease have spread over large areas during the year under review.

159. Rinderpest outbreaks occurred in three of the four Provinces. The mortality of two of these outbreaks exceeded 2,000, five per cent of the total cattle in the country, and the mortality of the other outbreaks was considerable but no figures are available.

160. In MacCarthy Island Province two outbreaks occurred shortly after the Veterinary Officer proceeded on leave in May 1937. At Kaur 539 deaths were reported ; the mortality in the other outbreaks is not recorded.

161. In North Bank Province outbreaks occurred in the Upper Niumi and the Baddibu Districts. The mortality figures are not available.

162. In South Bank Province the first outbreak occurred in Eastern Jara District shortly after the departure of the Veterinary Officer on leave. This outbreak appears to have been brought from North Bank Province. The disease smouldered for several months and eventually appeared to die out altogether but two months later a fresh outbreak occurred in Eastern Kiang when the whole villlage herd of forty animals died at Kaiaff. The carcases of bush pig were found in the farm lands surrounding the village. Later the disease appeared in Central Kiang where 750 animals of a total of 950 died.

163. A mobile Veterinary Unit was sent to carry out control measures but the owners, principally the Turankas and Fulas, refused the vaccinations. One Mandingo owner had his animals treated and escaped infection.

164. The disease later spread to Western Kiang where permanent immunisation was undertaken and some 200 cattle inoculated with a mortality of six.

165. In Foni Bondali District the disease broke out and vaccinations were undertaken. The disease appeared to subside after the vaccinations but later broke out in the calves of the vaccinated herds. The calves had not been vaccinated. This latter outbreak occurred as the Veterinary Officer was proceeding on leave. One African Veterinary Assistant was sent to arrange and supervise the quarantine but at the end of the period under review a fresh outbreak has occurred in the adjoining district of Foni Kansala.

166. A total of 1,463 deaths have occurred in these South Bank Province outbreaks during the year and deaths are still occurring.

167. *Rinderpest Immunisation Scheme.*—The Cattle Rinderpest Immunisation Scheme was commenced in 1933. The scheme is partly financed from the Colonial Development Fund and partly from the Revenue of the country.

168. The number of Cattle Immunised under the scheme during the years 1933—1938 is about 25,000 head. The totals for the past three seasons are:—

1935—36	...	... 1,800 head.
1936—37	...	... 11,690 ,,
1937—38	...	... 8,626 ,,

169. The immunisation in MacCarthy Island and Upper River Provinces has been completed. North Bank and South Bank Provinces have been commenced during the past season.

170. The Immunisation Scheme is planned to be completed with the 1938—39 season.

171. The method of permanent immunisation has been adapted to suit the peculiar local conditions. The Gambia Cattle are infected with but highly resistant to Trypanosomiasis and are highly susceptible to Rinderpest. The rate of mortality is high when the simultaneous inoculation of virus-serum alone is employed. To reduce the Rinderpest reaction to the minimum spleen vaccine is injected two weeks before the simultaneous inoculation. To intensify the immunisation a further injection of virus is given a week after the simultaneous inoculation.

172. Cattle immunised in this way have resisted infection in a natural outbreak two or three years after immunisation.

173. The production of Anti-Rinderpest Serum and Vaccine is undertaken by the Veterinary Unit in the field.

174. No Veterinary Research Work is undertaken in the country.

Utilisation of Cattle for Transport, etc.

175. Demonstrations of the utilisation of cattle for cultivation and transport purposes have been continued at the experimental farms at Yoroberikunda for about five years ; at Wuli for about two years ; at Cape St. Mary, at three centres in the Kombo Districts of the South Bank Province and at Kintikunda in North Bank Province during the past year. The results of the two latter demonstrations have aroused interest and requests have been made for the supply of ploughing outfits.

176. In the North Bank Province the three Chiefs of the Baddibu Distsicts have asked that four ploughing outfits be supplied them on payment and at Sukuta in the South Bank Province four elders of the village requested the supply of one outfit co-operatively.

177. The four pairs of trained oxen were supplied to the Baddibu Chiefs but owing to the lack of funds and other difficulties the ploughs could not be supplied this year.

178. Two ploughs available from the last ploughing demonstrations have been loaned to the Baddibu Chiefs for the season and a trained ploughman is being posted to this area to assist with the ploughing and to train the Chiefs own men.

Castration of Animals.

179. *Castration of Animals.*—The castration of cattle, goats and sheep has been demonstrated from time to time during the year in the North and South Bank Provinces. During the last month of the year under review Mr. K. B. Jarmeh, Overseer, visited nineteen villages in the Kombo Districts and 122 animals were brought for castration, including sixty-five bulls, twenty-one sheep and thirty-six goats. The operation was undertaken with the Burdizzo Castrators.

Ghee.

180. *Ghee.*—The introduction of the manufacture of Ghee was commenced by the United Africa Company, with the assistance of the department, at the commencement of 1938. Some 600 lbs. have been manufactured and a ready market found for the product in Bathurst.

181. Transport difficulties and lack of regular marketting facilities retarded the development of the industry. The collection of the fresh material ceased after two months just as quantities were increasing.

182. Towards the end of the period under review the United Africa Company re-commenced buying through their African Agent at Gunjur and regular supplies in increasing quantities are being purchased. In four weeks the quantities have increased from thirty to eighty pounds. The further development of this method of purchase will be organised as the village shops open for the trade season.

183. *Method of Ghee manufacture.*—The method of Ghee manufacture is the liquification of fresh butter at as low a temperature as possible, clarification through coagulation of the curd by gentle heating, separation of the fat by simple filtration and evaporation of excess moisture.

184. The method of manufacture of the Gambia 'Cooked Butter' is interesting as it is the first recorded method of the manufacture of Ghee direct from the ripened cream. The milk is allowed to stand for about six to twelve hours until the cream has risen to the surface, the cream is skimmed off and set aside to ripen,

when it has reached the stage of acidity usual for the making of fresh butter the cream is put on a low fire and heated gently until the curd is coagulated and separates from the pure fat. The pure fat is then poured off and put into containers for storage or for sale. The approximate per centage of Ghee obtained from the cream by this method is thirty per cent.

Dairying Industry.

185. *Survey of Dairying Industry.*—A quick survey of the Dairying Industry of the Kombo Districts was undertaken during the last month of the year under review.

The result of the survey is given in the following table.

District.	Total No. of herds.	No. of herds selling.				Herds with surplus milk and milk products.
		Fresh Milk.	Sour Milk.	Fresh Butter	Cooked Butter.	
Kombo St. Mary ...	28	12	17	14	11	5
„ North ...	21	9	19	16	11	10
„ East ...	21	3	10	9	9	18
„ Central ...	22	6	20	21	21	16
„ South ...	47	37	40	26	18	36
Totals	139	67	106	86	70	85
%age	—	48%	76%	62%	50%	61%

"*Fresh milk*" includes coagulated milk with cream.
"*Sour milk*" includes "buttermilk" without cream and milk that is regarded as 'sour'.

Miscellaneous.

186. *Transportation of animals by canoe.*—A committee consisting of the Marine Superintendent, the Medical Officer of Health and the Agricultural Superintendent, Cape St. Mary, was asked to investigate the conditions of transport of animals by canoe from Barra to Bathurst and to make recommendations for the prevention of cruelty to the animals between these two ports.

187. The first meeting of the Committee was held at the end of May 1938 and recommendations have been forwarded to Government for consideration.

188. *Hides and Skins.*—The continuation of the hides and skins improvement scheme was undertaken throughout the year under review. One new centre, Jowarra, North Bank Province, was added to the centres undertaking improvement. There is no indication that the scheme will be adopted in the provincial towns and villages other than the large trading centres with a European population. Progress under these conditions will be slow.

189. Extracts of the Imperial Institute report on sheep and goat skins form an appendix to this report.

190. *Shorthorn Cattle for Nigeria.*—During the year ten bulls and two cows of the Gambia and West African Shorthorn breeds were purchased and despatched to the Government of Nigeria.

Work At Experimental Stations.

(*a*). *Yoroberi-kunda Experimental Station.*

191. *Staff.*—Mr. F. W. Hall, Senior Agricultural Superintendent, continued in charge of this experimental station, the Sankuli-kunda irrigation area, and the MacCarthy Island Province in addition to his duties as head of the Department.

192. Mr. V. F. O. Olivier, Agricultural Superintendent, assumed these duties on the departure of Mr. Hall on leave on April 8th and remained on duty until 29th April when he was invalided to England.

193. From 29th April until the end of the period under review there was no European officer in charge but the routine work was supervised by Mr. N. M. Assheton, Commissioner, MacCarthy Island Province from Georgetown.

194. *Groundnut Variety Trial.*—In previous seasons observations and trials of the "Sir Charles" variety of groundnut has shown some superiority over the local varieties. A large scale experiment was undertaken during the year under review. The following table shows the result of the trial :—

Yield per acre.	Variety.				
	Sir Charles.	Basse.	Philippine White.	Castle Cary.	Philippine Pink.
lbs.	1,845	1,648	1,625	1,635	813

(All varieties sown on the 22nd & 23rd June).

195. The "Sir Charles" variety has shown a significantly higher yield and, in addition, has a well developed, uniform nut.

196. This variety will be grown for increase for distribution in the future.

197. *Spacing trial.*—This trial was undertaken for education and instruction of the recently appointed African Assistants and for the students under training.

198. Weather conditions were unfavourable to the rosette factor and though a few cases occurred in the wider spacings they were insufficient to provide a vivid impression of and to demonstrate the full value of close planting.

199. The trial plots were sown at a late planting date July 22nd and 23rd. Ten spacings were adopted 6″ x 6″, 1′ x 1′, and 2′ x 2′. Each spacing was repeated eight times. Plots measured 30′ x 50′.

200. The total number of rosette infected plants in the trial was twenty-six. Of this number only two plants in the 6″ x 6″ spacings were infested.

201. The following table of nut yields shows the value of close spacing.

Yield per acre.	Spacing.		
	6″ x 6″	1′ x 1′	2′ x 2′
lbs.	777	523	377

202. Though not strictly comparative with other early planted plots on the station, there is a great difference in the yields of nuts compared with the variety trial planted one month earlier.

205. The spacing trial indicates the value of close planting on the yields of nuts.

204. *Increase of Selections.*—Four selections of groundnuts originally made at Wuli in 1930 from individual plants had been gradually increased until sufficient was available, to plant reasonably large plots for observation this year, though not for statistically comparative trials. The results were disappointing, only one appears worthy of further trial against the "Basse" selection which constitutes our standard.

205. *Guinea Corn Selections.*—The varieties covered under this selection work were 'Niaro', 'Gajabo', 'Sufenio', 'Bassiba Kinto', and 'Kinto'.

206. The 1936 selfed varieties of 'Passiba Kinto' and 'Kinto' gave a fair standard of purity and several types showing variation in seed and glume colour have been re-selfed for further work.

207. Of the other varieties of guinea corn, all originally from the Wuli station, selections were made and in the 'Gajabo' (Goose-necked guinea corn) a few outstanding plants were selfed. The goose-neck character however was not found to be stable in the selections as received from Wuli. The straight-necked type gave equally as many goose-necked plants as the goose-necked type gave straight-necked plants.

208. *Bulrush Millet.*—Selections of Pennisetum pycnostachyum known locally as 'Komba' or 'Marjo' were grown for selfing. The plants did not grow well owing to the heavy nature of the ground they were planted in.

209. '*Suno*'—(Pennisetum Gambiense) was also planted for selfing. Owing to trouble with crop guards bird damage upset any possibility of reasonable selection work.

210. *Maize.*—As a rule this crop is grown as a 'compound' crop in the yards of the villagers and is rarely grown as a field crop.

211. A small area was planted in known poor soil which was manured at the rate of six tons to the acre and ploughed. Growth, though not vigorous, was was at least equal to the African compound-grown plots.

212. Unreliable guards and night visitors caused the crop to be a failure and demonstrated why the Africans do not plant the crop outside their compounds.

213. *Soil Treatment Trial.*—As a preliminary to instituting a rotation trial on mixed farming lines a treatment trial was laid down on some of the poorest land on the farm. Groundnuts had occupied the land for many years prior to the opening of the farm in 1933 and the previous seasons crops were sunn hemp and velvet bean.

Six treatments were tried.

i. Farmyard manure at three tons per acre and ploughed.
ii. Farmyard manure at two tons per acre and ploughed.
iii. Green manure ploughed in.
iv. Green manure burnt off and ploughed.
v. Ploughed only.
vi. Control. No manure, not ploughed.

Three crops were planted; i. Guinea Corn, ii. Setaria italica and iii. Eleusine corocana.

All plots were sown between 28th and 30th June.

214. At the beginning growth was retarded by the unfavourable weather conditions. Up to the middle of August there was little or no apparent difference in growth but from this time the farmyard manured plots began to show a more rapid and superior growth. Towards the end of August the green-manured plots that were ploughed showed superior growth to the control plots. More frequent weeding was necessary in the control plots and, in addition, in these plots striga (Silo) was more prevalent.

215. The setaria ripened towards the end of September but harvesting was delayed until October so that the standing crops might be seen by African visitors to the farm. Towards the end of October the Eleusine was harvested and at mid-November the guinea corn was cut.

216. The yields of the crops under the various treatments are shown in the following table:—

Crop.	Treatments.					
	Manured 3 tons ploughed.	Manured 2 tons ploughed.	Green Manure ploughed.	Green Manure burnt off ploughed.	Ploughed Only.	Control.
Guinea Corn ...	1,063	1,049	856	812	665	414
	(S. E. 48.)					
Setaria Italica ...	785	649	332	381	283	158
	(S. E. 44·5)					
Eleusine Corocana ...	741	566	523	545	392	305
	(S. E. 49.)					

(*Note.* Yields are in lbs. per acre).

217. The treatments in all cases except the ploughed-only plots of setaria and eleusine are significant compared with the control plots.

218. In the green manure treatments there is no significant difference between the green manure that was ploughed into the soil and the green manure that was burnt off before ploughing.

219. The difference between the farmyard manured and the green manured plots show a yield in favour of the former in the case of the guinea corn and setaria. With the setaria the difference is more significant and this, no doubt is due to the period for maturity of the crop being of too short a duration to allow the soil to incorporate the food elements in time for their assimilation by the plant.

220. The results, as a whole, exceeded expectations and demonstrated the value of manuring and ploughing over other treatments.

221. The experiment created a wide interest among the surrounding population. The results to them were unanticipated.

222. *Striga* (*Silo*) *Control trial.*—A small experiment was laid down on land heavily infested with striga to determine the effect trap-cropping would have on the incidence of the parasite.

223. Six plots were ploughed, three of these were sown with guinea corn in lines and the remaining three sown broadcast.

224. The ploughing of the land appeared to have the effect of burying the seed too deeply to germinate freely. Random counts of sections of the plots failed to give any significant difference and the silo population was negligible.

225. The 'silo' as it appeared was allowed to reach the flower-bud stage in the plots. Towards the end of the rains the broadcasted crops were ploughed into the soil burying all growth. In the line sown crops the 'silo' was hand plucked and the corn crop harvested. The experiment will be continued next year.

226. *Cotton.*—Several individual selections of Cambodia cotton from last seasons crop were sown on the 24th July. The general growth by the end of October was retarded and indications were that the sowing had been too late for the plants to take full advantage of the rains.

227. Boll shedding was prevalent. Much rogueing of undesirable types was carried out and all remaining individual plants separately harvested for examination and for the retention of those showing satisfactory lint characteristics.

228. *Tobacco.*—Seed of Western Dark Nyasa (WDN) was sown in beds with the intention of planting it as a field crop during the wet season. A severe storm broke the protecting covering to the bed on 11th July and destroyed most of the seedlings.

229. Sufficient seedlings remained to undertake the experiment on a small scale. The leaf production was satisfactory. The plants were allowed to seed for further propagation.

230. Seed of "Blue Pryor" and "WDN" were obtained from Uganda during the year. The seed arrived too late for the wet season planting experiment but was sown for dry season cropping at the Sankuli-kunda irrigation area.

231. *Sesame.*—A small area of white seeded variety was planted for trial. Growth was satisfactory but as the plants were reaching maturity root disease destroyed the crop.

232. *Ginger.*—A small quantity of rhizomes saved from the previous season were planted for re-trial but the result was not satisfactory. The conditions in the Middle River Area are too dry. Further experiment is being made in the irrigation areas of the Lower River Provinces.

233. *Sweet Potatoes.*—Small areas were planted with vine cuttings obtained from the dry season crop of the irrigation area. The crop was grown for vine distribution to the local farmers. The demand was greater than the supply. A good crop of tubers was obtained.

234. *Yams.*—Several types were planted for trial but the indications are that the rains in this district do not provide a sufficiently moist condition for the maturity of this crop.

235. *Cover Crops.*—Native bean (Vigna spp.), velvet bean, sunn hemp and pigeon pea were planted for seed and soil improvement purposes.

236. *Shea Trees.*—At the same time as the shea nuts were planted in the districts a plantation of two acres was sown under similar conditions and methods on the farm.

237. The seed was planted on 21st July, the spacing was 12′ x 12′ and four seeds planted to each site.

238. Germination was slow and continued until the end of January when a count showed 66% of the sites had germinated seed. Some of the sites had more than one germinated seed.

239. The seedlings were protected from sheep and goats but during the month of February a number of the ungerminated nuts were removed. Later wild hares were caught digging up the nuts, but, so far, growing seedlings have not been touched.

240. *Gum Arabic.*—The seedlings transplanted in the field in 1936 are showing satisfactory growth but have not yet reached the stage when tapping for gum can be undertaken.

241. Further areas were planted at stake during 1937 rainy season but germination was not successful.

242. Seedlings were raised in a nursery and transplanted as a live fence around some of the African compounds. This method of raising plants appears to be more satisfactory than planting the seed 'in situ'.

243. *Ploughing.*—Demonstrations in the districts curtailed the trials of different types of ploughs. Trials of DY Plough and S2 Ridger were undertaken. In both cases the load proved too heavy for the local animals.

244. By cutting the breasts and remoulding them the S2 Ridger gave satisfactory results. One pair of oxen on sandy soil ridged nearly two acres in one period of 4½ working hours.

Further trials will be undertaken.

The major portion of the ploughing on the farm was undertaken with the Sutlej single furrow plough. This plough has given satisfactory results.

245. *Soil Conservation.*—The soil erosion in relation to agricultural practise in the Gambia is not such a serious problem as in other West African countries but should cattle cultivation take its place in local agriculture the problem might be aggravated.

246. The farm at Yoroberi-kunda is the only place in the country where cattle cultivation has been undertaken over a period of years, in this case four years, and it is desirable to record the effects where extensive areas have been ploughed.

247. The farm was established in 1933. Previous to this time the ground was cultivated by the local farmers by their usual methods of shallow or no cultivation and no stumping. Several footpaths and one road ran through the area, several of these had been heavily eroded through continuous use and their angle to the adjoining hill.

248. A large run off occurred between the farm and the hill and this was intensified when the land was stumped for ploughing.

249. In 1934 dry season the road was diverted by the local authorities and a catchment was constructed on the hill side of the road. Results were soon apparent; the erosion of the paths and road ceased and at the end of 1935 had disappeared.

250. The following season the local farmers cultivated the land between the hill and the farm. Increased traffic on the outside road in 1936–37 dry season caused re-erosion of the old paths and road this year, 1937.

251. Sheet erosion on a small scale began to take place in the area close to the hill and it is evident that preventive measures will have to be taken. Strip cultivation appears to be the measure most suited for the purpose.

252. In 1935 and 1936 certain natural lines of drainage were constructed to take off the excess water on other parts of the farm but these are inadequate to deal with the additional run off coming from outside the farm boundary and it will be necessary to protect the farm boundary near the hills by redirecting the run off from the hills to a near by natural line to the swamps.

253. It appears that on the farm and the immediate surrounds the subject of erosion in relation to local agricultural practices of the country can be dealt with and it is expected that several of the problems of soil conservation will be solved before cattle cultivation really takes its place in local agriculture.

(*b*) *Sankuli-kunda Irrigation Area, MacCarthy Island Province.*

254. *Wet Season.*—During the rainy season work was confined to rice cultivation. The principal work was the increase of stock Guiana Creole, Hill Paddy, GC 79, Kavunginpoothala, D'jougoutes, Bali and GEB 24. The last named variety was introduced from Sierra Leone during the year.

255. A small scale experiment was attempted to determine the value of the application of manure and ash to the soil on the growth of rice. The result was inconclusive and indicated the desirability of increasing the replications, constructional alterations and reduction of the size of the plots.

256. The drought period necessitated the flooding of the rice flats before transplanting could be undertaken. The result demonstrated the great value of irrigation in seasons of irregular and abnormally low rainfall and was an object lesson to the local cultivators.

257. The new variety GEB 24 imported from Sierra Leone gave satisfactory results the yield being the highest of all varieties grown in the area.

258. GEB 24 is a small seeded variety with a loose branched head quite different from any variety grown in this country. The local cultivators were impressed with this rice and there has been a keen demand for seed.

259. *Karinginpoothala*, the deep water rice, which was received too late in 1936 to give it a fair trial, was sown early and transplanted in early-July in the deepest water flats of the area.

260. The flood depth, which normally is 3′ 6″ to 4′, did not exceed 2′ 6″. The plants grew well and headed at 6′, harvesting was carried out in January. During the early part of the season some damage was caused by fish plucking the plants just above soil level upsetting the yield data of the crop.

261. Guiana Creole and Hill Paddy gave satisfactory results.

262. The yields of some of the rices grown in the area during the year are:—

Guiana Creole	...	...	2,072 lbs. per acre.
Hill Paddy	...	...	1,548 ,,
Bali	...	...	1,243 ,,
D'jougoutes	...	...	2,038 ,,
GEB 24	...	...	2,345 ,,

263. Adjacent rice fields of the local farmers were examined and estimated yields varied from 600 lbs. to 900 lbs. per acre. The former figure for broadcast and the latter for transplanted crops.

264. *Dry Season.*—The most suitable portion of the area for dry season cropping was occupied by Kavunginpoothala rice which was not harvested until January. Dry season cultivation was in consequence confined to food crops and tobacco.

265. As a result of the previous dry season's experience the land utilized was heavily manured to lighten the heavy nature of the soil. All plots were manured at the rate of 10 tons per acre.

266. The result was a marked improvement on the crops of the previous season. In freshly prepared plots used for the first time the results were less satisfactory indicating the necessity to manure the soil over a period of years before the best results can be obtained.

267. The chief food crops grown during the dry season were sweet potatoes and capsicums (peppers). Both these crops had given indications of being valuable economic crops to grow under the local conditions. Other crops grown included tomatoes (Native variety), cabbage, lettuce, jakato (*Solanum incanum*) and bananas.

(*c*) *Wuli, Upper River Province.*

268. For the major part of the year the farm was in charge of Mr. G. D. Edwards, Overseer, and it was not possible to undertake experimental work.

269. The farm was a useful demonstration centre for cattle cultivation. Demonstrations were given for the benefit of Chiefs and Headmen who visited the farm.

270. Farm operations were mainly confined to increasing the stock of seeds and plants for distribution to the provincial cultivators. Early in the season the seed stocks held by the farm were valuable in meeting seed and plant shortages in the province due to locust invasion.

(*d*) *Lower River Provinces.*

271. *Staff.*—Mr. J. Pirie, M.M., Agricultural Superintendent, continued in charge of the work in Bathurst, South and North Bank Provinces, Cape Saint Mary station, Dunyajoe and Bulok Irrigation Areas until August 12th when he was invalided to England.

272. Mr. L. H. Saunders, Agricultural Superintendent, resumed duty in the Lower River Provinces on the departure of Mr. Pirie and remained in charge until the end of the period under review.

273. *Cape St. Mary.*—The work of this station for the greater part of the year has been in charge of various students recently appointed and undergoing training with the supervision of the Agricultural Superintendent during the time he is in the station.

274. *Soil Fertility.*—To improve the low soil fertility of the nurseries some twenty tons of compost was made from groundnut straw, fallen leaves and crop refuse during the rainy season. A further 100 tons is in process of manufacture for the coming season.

275. *Propagation of Plants.*—The principal work of the station has been the propagation of plants for distribution throughout the country. The raising of some 7,000 seedling orange trees for village plantations in the Kombo districts; large numbers of ornamental trees and shrubs for the Bathurst and Fajara planting schemes; and budded and grafted citrus, mango, breadfruit, etc., trees has been undertaken.

276. *Trials* (*i*) *Capsicums.*—Imported varieties of hot peppers have been planted for trial. The plants have been grown successfully and a large quantity of seed distributed to the local farmers. The varieties mostly in demand for planting by the Africans are "Tabasco", "Cayenne", "Long Cayenne", "Long Red Chile", "Large Bell", "Hungarian Wax".

(*ii*) *Tomatoes.*—Imported varieties of tomatoes were planted for trial. "Marglobe", "Beauty" and "Oxheart" were grown successfully. The two former varieties are most suited for local markets.

(*iii*) *Sweet Potatoes.*—Small plots of imported sweet potatoes, "Nigerian White" and "West Indian Pink" varieties were planted. Growth was not vigorous, and the crop was kept for seed increase.

(*vi*) *Sunn Hemp.*—A small trial plot of sunn hemp was planted. Growth was not vigorous, and the crop was kept for seed increase.

(*v*) *Tobacco.*—Small trial plots of "Western Dark Nyasa" and "Hausa Red-flowering" varieties were grown successfully. The leaves were harvested and cured and the seed saved for distribution.

(*vi*) *Shea.*—One small bed of shea seedlings planted three years ago has made good vigorous growth. A small trial plot was planted with seedlings raised in the nursery last year. Of fifty trees transplanted twenty-one survived the dry-season. The trees were badly damaged by goats during January but many survived in spite of this.

277. *Utilisation of Refuse.*—About fifty tons of groundnut shell was obtained from the Bathurst decorticating factory, this with cattle stable bedding, fallen leaves and crop refuse is being utilised for the manufacture of compost for fertilisation of the soil. About 100 tons is in the process of manufacture.

278. *Training of Cattle.*—A number of the Gambian shorthorn bulls have been purchased and trained as ploughing and transport animals during the year. Training has included pack loads as well as wheeled transport. Some of these animals have been supplied for the ploughing demonstrations of North and South Bank Provinces and for Nigeria.

279. *Transport Cattle.*—A small herd of seven young bulls and oxen have been retained and are being trained to light work. These animals will be utilised for ploughing and station transport work when they are big enough.

(*e*). *Bulok Irrigation Area. South Bank Province.*

280. *Staff.*—Owing to the incidence of leave, sickness, provincial work and other causes no less than five changes in the African supervising staff has been necessary at this area. This has prevented continuity of the work of the area especially as some of the staff in charge of the station had little or no previous experience of irrigation and working without continuous European supervision.

281. *Wet Season Cropping.*—The area was cropped with Guiana Creole rice for increase. The crop harvested was a good one.

282. *Dry Season Cropping. Rice.*—Guiana Creole rice was planted at a fortnightly intervals from the end of September until the end of December. The sowings of September and October were puny in growth and when transplanted did not tiller freely, the whole of the plantings were discarded and the ground used for later crops.

283. The sowings of November and December gave good healthy growth and produced heavy crops. Harvesting of the later plantings of these sowings still continues.

284. The plots in which this rice was grown were fertilised with a three-inch dressing of compost manufactured from crop refuse prepared in the area. A yield of 2,730 lbs. per acre was obtained on two plots measuring 30′ x 40′. This is the highest yield recorded in the irrigation areas.

285. The plots that gave the best results were planted with seedlings of four weeks growth, about eight inches in height and of dark coloured leaves. These seedlings were kept with a depth of three to four inches of water up to the time the grain commenced to ripen, tillering was very free. The average tillering of two lines of sixty-two plants per line was thirty-one.

286. *Hill Paddy.*—Hill Paddy rice was sown in December, the seedlings were transplanted in January but growth was puny, tillering poor and only a low yield of grain obtained.

287. *Ginger.*—A small trial plot of Nigerian ginger has been planted for trial. The growth after two months was satisfactory.

288. *Capsicums.*—Small trial plots of imported varieties of peppers were planted. Very heavy yields of fruit have been obtaned. "Tabasco", "Cayenne", "Long Red Chilie" and "Large Bell" have been distributed to the local farmers for planting.

289. *Onions.*—A small trial bed of "Brown Flat" onion from imported seed was grown sucessfully. Some 100 onions were raised and averaged 11½ ozs. in weight. The largest bulbs weighed 18 ozs. This crop attracted the interest of the local villagers and a demand for seed for next season has been created.

290. *Tobacco.*—Two small trial plots of WDN tobacco were planted and have given a heavy yield of leaf. A small quantity was cured. Seed is being kept for distribution.

291. *Sweet Potatoes.*—Two plots have been planted for increase and for distribution of vines during the rainy season.

292. *Yams.*—A small trial plot of yams raised from aerial vine tubers have been planted and are showing satisfactory growth.

293. *Tomatoes.*—Small plots were planted for trial. The varieties "Marglobe", "Tangerine" and "Ox-heart" have given good yields of excellent fruit. The two former varieties travel well. The seed obtained from the fruit was not sufficient to supply the demand.

294. *Fruit and Economic Trees and Plants.*—A number of fruit and economic trees were planted for trial and demonstration including orange, lime, grapefruit, grafted mango, cocoanut, caryota, banana, breadfruit, breadnut, avocado, pawpaw, etc. A plantation of seventy-five orange trees have been planted for demonstration on the dry land farmland adjoining the area.

295. *Wheat.*—A small plot of alkama (Nigerian Desert) wheat was planted for trial but failed to germinate.

(f) Dunyajoe Irrigation Area. North Bank Province.

296. The work of this irrigation area has been in charge of Mr. S. Dibba, Overseer, throughout the year. In addition, crop and produce inspection of the Lower Niumi District, laying-out and superintending the new Barending irrigation area and the instruction of recently appointed students in irrigation practices has been undertaken.

297. The policy of confining the dry season irrigation crop to rice, which has been demonstrated successfully for five years, has failed to attract the attention of the people. This year an attempt was made to arouse interest by demonstrating the growing of minor agricultural and garden crops.

298. At first no attention was paid to the demonstration but when a second planting for succession of crops was commenced a demand was made for the supply of seedlings by the women of the adjacent villages.

299. Seedlings of minor crops were issued on condition that an equal area of rice was planted. This was agreed to after some hesitation. The demand for irrigation plots occurred and the whole of the fifty-seven available plots were distributed for cropping. The supply of seedlings of rice and minor crops was soon exhausted and seed was issued for later cropping.

300. The result has been very satisfactory, the crops obtained have been good and the villagers are preparing to extend the area.

301. From time to time specimens and samples of the crops grown in the area have been taken to Berrending, and through these the interest of the villagers was aroused and the opposition of the village elders to the development of the irrigation scheme overcome.

302. *Wet Season Cropping.*—The whole area was cropped with Guiana Creole rice for increase of seed. The crop yields obtained were good.

303. *Compost.*—The manufacture of compost from groundnut straw, other crop and vegetative refuse was undertaken to provide manure for the dry seasons crops.

304. The compost was manufactured in large pits containing several thousand loads of material. This method proved an unsuitable demonstration for the local people and small pits of a size to provide sufficient manure for each individual plot were constructed. The manufacture of compost is now being undertaken by the villagers for their own plots.

305. *Dry Season Cropping. Rice.*—Guiana Creole rice was sown at fortnightly intervals from October to December. The sowings up to the middle of November did not produce vigorous seedlings and they were discarded. Some of the flats planted have partially failed owing to the drying out of the higher levels due to the abnormally low rainfall. The remaining flats have produced a good average yield of grain.

306. *Hill Paddy Rice.*—This variety of rice was sown in December from seed obtained from Sankuli-kunda. The growth of the seedlings at transplantation was slow but a grain yield above the average was obtained. On one plot a yield of 1,450 lbs. per acre was obtained.

307. *Capsicums* (*Peppers*).—A trial of imported peppers was made and has given successful results. The most successful varieties which have created a demand for seed from the local villagers have been "Tabasco", "Hungarian Wax", "Red Berry", "Cayenne", "Long Cayenne", and "Long Red Chillie"; "Large Bell" and "Small Berry". All these varieties have been readily disposed of in the local markets.

308. *Onions.*—A trial of imported "Flat Brown" onions has been successful. Onions of good regular shape, good flavour and large size have been produced. The largest onions weighed 22 ozs. and the average of the whole bed of eighty-seven onions was 14½ ozs. This crop has attracted much attention and the demand for seed has been great. There is every indication that onions will be extensively grown in the irrigation areas in the future if seed is available.

309. *Shallots.*—A small trial bed was planted for demonstration. The yield of bulbs was satisfactory. The best sets produced ten to thirteen shallots of good even size and flavour. This crop also attracted the attention of the people.

310. *Tomatoes.*—The varieties "Marglobe" and "Tangerine" were successfully grown and large quantities of fruit distributed for seed purposes.

311. *Tobacco.*—The WDN variety has been successfully grown. The plants have shown vigorous growth and produced some good leaves. The leaves have been cured and distributed for propaganda. Demand for seed for planting was made but supplies are being witheld until the next dry season when it will be ssued for irrigation planting.

312. *Ginger.*—A small trial plot of Nigerian ginger has been planted and is showing good growth two months after setting the rhizomes.

313. *Bitter Tomato.*—A trial bed of the local bitter Tomato (Solanum aethiopicum) produced a heavy yield of large yellow and purple fruits for which there was a keen demand for seed.

314. *Garden Egg.* (Brinjal or Eggfruit).—A small trial bed produced some very large fruit weighing up to 2 lbs. All the fruit was distributed to the people for seed.

315. *Sweet Potatoes.*—A small bed was planted to raise plants for vine distribution. The whole of the crop was destroyed by monkeys.

L. Distribution of Plants and Seeds.

316. The following were distributed from the various Agricultural Stations :—

(*a*) Economic Fruit Trees.		
Citrus spp.	194	
Mangoes	36	
Avocado Pears	12	
Various	328	
(*b*) Decorative plants various ...	5,684	
(*c*) Food Crops.		
Selected Rices	4,286	lbs.
Guiana Corn	1,429	„
Maize	1,317	„
Millet	346	„
Groundnuts	540	bushels
Sweet Potato Slips	2,000	cuttings
Cassava Sticks	13,065	sticks
Okra	65½	lbs.
Setaria Italica	340	„
Native Beans	51	„
Sunn Hemp	82	„

SECTION III.

MISCELLANEOUS.

M. Financial.

317. *Departmental Expenditure.*—Departmental expenditure for the year 1937 was as follows :—

		£	s.	d.
1—7.	Personal Emoluments	2,622	5	2
8.	Sea Passages	160	6	6
9.	Transport Allowances	98	15	—
10.	Travelling Allowances	41	16	9
11.	Transport	218	12	5
12.	Sundries	49	13	—
13.	Scientific Appartus	6	5	—
14.	Plants, Seeds and Fertilizers	33	6	3
15.	Labour	973	12	4
16.	Technical Library	—	13	6
17.	Tools, Implements and Machinery ...	70	6	3
18.	Upkeep and Planting Botanical Gardens, etc. ...	33	6	5
19.	Paddy Improvement and Dry Season Cultivation	198	8	6
20.	Purchase of Cattle	30	10	—
	Total	£4,537	17	1

318. *Cattle Immunization Scheme* :—The expenditure in connection with the Cattle Immunization Scheme for the year is as follows :—

	£	s.	d.
One Veterinary Officer	767	8	2
Seniority Allowance	29	4	6
Commuted travelling and transport allowance ...	31	9	0
Laboratory Assistant	54	12	10
Veterinary Assistants	84	3	2
Compensation and maintenance of animals used for production of serum	340	0	2
Purchase of Instruments etc.	25	0	8
Transport	203	0	2
Sundries	27	5	1
Sea passages...	44	8	3
Total ...	£ 1,606	12	0

319. *Receipts.*—Revenue derived from sale of Economic and Decorative plants, and Seed of Economic Crop £15 4 10

320. *Staff Changes.*—The principal staff changes during the period under review are as follows :—

321. Mr. F. W. Hall, Senior Agricultural Superintendent, proceeded on leave on 8th April, 1938.

322. Mr. V. F. O. Olivier, Agricultural Officer, Nigeria, was seconded to the Agricultural Department of the Gambia as Agricultural Superintendent on 12th February, 1938, appointed Acting Senior Agricultural Superintendent on the departure of Mr. F. W. Hall, 8th April, 1938. Owing to ill-health, he was invalided home on 29th April, 1938.

323. Mr. J. Pirie, M.M., Agricultural Superintendent proceeded on leave on 12th August, 1937, and at the expiration of his leave proceeded to Nigeria on transfer as Agricultural Officer on 9th March, 1938.

324. Mr. L. H. Saunders, Agricultural Superintendent, remained in the Colony during the period under review and was in charge of the Lower River Provinces. Appointed Acting Senior Agricultural Superintendent on 30th April, on the departure of Mr. V. F. O. Olivier.

325. Mr. R. C. Camara, Third Grade Clerk, proceeded on leave of absence on 29th October, 1937, for a period of six weeks and resumed duty on 10th December, 1937.

326. Mr. J. Touray, Third Grade Overseer, proceeded on leave on 4th August, 1937, for a period of one month.

327. Mr. K. B. Jarmeh, Third Grade Overseer, proceeded on leave on 4th March, 1938, for a period of one month.

328. Mr. M. Faal, Agricultural Assistant, was terminated from the services of the Agricultural Department of the Gambia Government on 17th December, 1937, on medical grounds.

329. Mr. S. T. Rendall, Agricultural Assistant, proceeded on leave on 1st February, 1938, for a period of one month.

330. Mr. J. Lloyd, Agricultural Assistant, proceeded on leave on 4th May, 1938, for a period of one month.

N. Appointments.

331. Messrs. A. M. Jallow and J. C. Jatta were appointed Agricultural Assistants as from 10th January, 1938, and Messrs. D. Jack and O. Joof as from 1st May, 1938, for a probationary period of three years.

O. Staff of the Department of Agriculture.

332.

Senior Agricultural Superintendent ...	F. W. Hall.
Three Agricultural Superintendents ...	V. F. O. Olivier, L. H. Saunders, (one vacancy).
One Clerk, 3rd Grade	R. C. Camara.
Five Overseers, 3rd Grade	G. D. Edwards, S. Dibba, J. Touray, K. B. Jarmeh and M. B. Jagne.
One Probationer Storekeeper	J. E. Mungo-Lusack.
Eight Agricultural Assistants	S. T. Rendall, J. Lloyd, R. Lloyd, A. M. Jallow, J. C. Jatta, D. Jack, and O. Joof. One vacancy to be filled by a Student undergoing training.

P. Legislation.

333. *Summary of Legislative Changes.*—An Ordinance to amend the adulteration of Produce Ordinance is under consideration.

L. H. SAUNDERS,

Acting Senior Agricultural Superintendent.

16th June, 1938.

APPENDIX I.

Report on "Beeswax from the Gambia."

Description.

The sample consisted of a roughly hemispherical block of fairly hard, yellowish-brown beeswax, weighing 2½ lbs. Its odour was slightly musty. The wax was fairly clean and homogenous, but differed from the Gambia beeswax of commerce in not possessing a granular appearance when fractured and in lacking the characteristic odour.

The material was examined with the results summarised below, which are shown in comparison with those obtained for the sample of beeswax from the Gambia previously examined at the Imperial Institute. The following results were obtained with the wax as received:—

	Present Sample	*Previous Sample.*
	per cent.	per cent.
Loss at 105°C	0·1	0·1
Ash	0·03	0·04
Matter soluble in boiling water	0·03	0·03
Dirt	0·5	0·2

	Present Sample	*Previous Sample.*
Specific Gravity at 15·5° C/15·5°C	0·9643	0·9651
Melting Point (by open tube method)	63·5°C	64·0°C
Refractive Index at 40°C ...	1·454	1·4551
Acid Value (a)	16·5	17·2
Saponification Value (b) ...	98·2	96·0
Ester Value (b-a)	81·7	78·8
Ratio Number $\frac{b-a}{a}$	5·0	4·6
Iodine Value (Wijs, 3 hrs.), per cent.	11·2	10·5
Hydrocarbons, per cent. ...	13·2	11·9
Salamon and Sueber's Test ...	58·4°C	58·6°C

The following tests were also carried out on the filtered wax in order to determine the presence or otherwise of certain specific impurities :—

Test.	*Result.*
Weinwurm's test for the presence of parrafin wax and ceresin.	Negative result.*
Test for the presence of stearic acid.	"
British Pharmacopœia method for the detection of the presence of fats, Japan wax, fatty acids and resin.	"

These results show that the present sample contained 0·5 per cent of dirt as compared with 0·2 per cent in the case of the sample examined in 1935, and that the wax was of normal composition and closely resembled the previous material."

Commercial Valuation.

The beeswax was submitted to two firms of brokers and to a firm of importers in London, who furnished the following observations upon its commercial valuation and upon the desirability of cleaning the material before shipment from the Gambia.

In comparison with the Gambia beeswax of commerce the present sample of cleaned beeswax is rather darker in colour, and has neither the usual granular fracture nor the characteristic odour. These differences may be due to the original

*Also in the case of the sample examined in 1935.

raw wax not being collected from the usual sources of commercial Gambia beeswax, or they may be attributable to the cleaning process employed.

In the opinion of one of the firms of brokers and of the importers consulted the wax is of a quality which would be quite marketable in the United Kingdom and comparable with the usual Gambia wax, no further treatment being necessary. It would be currently worth from 105s. to 110s. per cwt. c. i. f. London. The second firm of brokers considered that its appearance was against it and that it differred considerably from f. a. q. Gambia wax: they stated, however, that it would be saleable, but only at a low price.

Beeswax in the form moulded in a calabash is known in the trade as a 'cup', in a gourd as a 'saucer', and in a mould as a 'brick.'

In those districts or countries where the beeswax prepared as above is more or less uniform in colour, it is customary to re-melt the small blocks weighing about 56 lbs. each. This is stated by the firms consulted to be the usual practice adopted for Gambia beeswax, and is to be recommended provided the above condition as to uniformity of colour prevails.

Where the 'Cups,' 'Saucers' or 'Bricks' of wax differ considerably in colour, it is usual to export the wax in these original forms : this practice is adopted in the case of Dar-es-Salam wax, The object of this is to enable users to sort out the wax into the different colours, as the lighter-coloured wax generally bleaches more readily than the darker material.

The three main uses to which beeswax is put are for the manufacture of polishes, candles and electric cables. For all these purposes the imported wax is in most cases refined and bleached before use, either by the firms who use it, or by wax merchants. Such treatment entails the melting of the wax, when any dirt present is removed. There is therefore no object in cleaning the wax before export beyond the stage obtained in the simple process given above, provided the amount of dirt is not excessive. In general the trade is not in favour of such additional cleaning, except when essential. Moreover it is very doubtful whether the cost of cleaning the wax before shipment would be covered by the additional price obtainable in London for the cleaned product. It may however be stated that a wax which is of attractive appearance and clean has a more ready sale than a less clean one, and may at times command a small premium. If the wax is very dirty there might be a difference of from 5s. to 10s. per cwt., between its price and that of a clean wax.

Conclusions.

From the foregoing results and observations it will be seen that the present sample of specially cleaned wax differs from the usual commercial consignments of Gambia wax in having a cheesy fracture instead of a granular one, and in lacking the strong characteristic odour of Gambia wax. According to two trade firms consulted this variation, though undesirable, would only slightly reduce the value of the wax. The third firm consulted took a more serious view of the difference in appearance, and considered that the value would be substantially lowered.

The difference in appearance and odour may be due to the source of the wax or to the cleaning treatment it has received.

In any event, unless the rough wax is excessively dirty it would probably not be remunerative to clean it in the Gambia, since the bulk of the wax imported into the united Kingdom is refined by merchants or consumers before use.

APPENDIX II.

Report on Sheep and Goat Skins from the Gambia.

Extracts from The Imperial Institute Report dated 3rd May, 1937, on sheep and goat skins submitted for examination.

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The samples were placed before the Imperial Institute Advisory Committee on hides and skins and favourable opinions were expressed on them by members. One of the members said that in his experience Gambia goat skins were in general the worst flayed skins with which he had dealt, but that the present skins were far superior to those he had previously seen from the Colony and he had regarded them as of very satisfactory appearance.

Members of the committee representing tanning firms undertook to tan and dress the sample and to furnish reports on their quality. For this purpose the goat skins were put in hand by a firm of glace kid manufacturers and the sheep skins by a firm making glove leather. Reports have now been received from these firms and are as follows :—

Goat Skins.—If they could collect skins like this there would be a ready market here today for any quantity at about 25s. per dozen, but I am doubtful whether bulk would come through anything like this. At numerous times I have had small parcels of Gambia goat skins, and they have not been like these skins; they are generally very badly flayed and cured, and have fetched an extremely low price generally something in the neighbourhood of 10s. per dozen. If however skins could be collected in quantity and of a quality equal to these five skins I would give an order today for 1,000 dozen at 25s. per dozen.

Sheep Skins.—Our report is that these skins make glove leather of good medium quality, which would be thoroughly saleable. Their shipment to this country is definitely to be encouraged. To prophesy the value of these skins in the run on this market is a very uncertain thing, but I should imagine the minimum value would be 30s. per dozen c. i. f. London, and their eventual value would depend upon building up a reasonable reputation.

From the foregoing reports it will be seen that the tanning trials confirmed the favourable view of the raw goods as expressed at the meeting of the committee. The flaying and drying of the skins are very satisfactory, and no alteration in the method of preparation is therefore recommended.

The square shape of the skins is a good feature, and should be retained, providing no undue stretching from the natural shape takes place in the fixing of the skins in the drying frames. The good appearance of the skins in this respect is attractive, and acts beneficially in selling, though it cannot be said that any additional price is paid for it. The main considerations, apart from the inherent characteristics of the skins, are flaying and drying. The quality of the present samples is far above that of the usual run of Gambia skins in the past, and it should be noted that the prices quoted refer only to consignments of equal quality.

The production of goat and sheep skins of the standard of these samples is thus to be recommended.

APPENDIX III.

Statistics showing Shea Nut Germination in Provinces.

Province and District.	Village.	Number of Pegs planted.	Germination in Plants. 31st May, 1938.
SOUTH BANK.			
Kombo St. Mary	Cape ...	386	Nil
„ North	Sukuta ...	386	75
„ Central	Brikama ...	579	92
„ South	Gungur ...	193	34
„ East	Faraba ...	193	21
Foni Brefet	Basse ...	386	11
„ Bintang	Kassang ...	193	8
„ Jarrol	Kalaji ...	193	6
„ Kansala	Bwiam ...	193	Nil
Kiang West	Batteling ...	400	95
Central Kiang	Kwinella ...	400	43
Eastern „	Kaiaff ...	400	123
Western Jarra	Simkunda ...	400	191
Central „	Japenni ...	400	33
Eastern „	Bureng ...	400	131
MACCARTHY ISLAND.			
Western Niamina	Katamina ...	400	109
Niamina Dankunku	Dankunku ...	400	42
Eastern Niamina	Kudang ...	400	7
Fulladu West	Sankuli-kunda ...	570	172
MacCarthy Island	Georgetown ...	306	3
Sami	Koli-kunda ...	471	81
Niani	Mecca	400	6
„	Kunta-ur (up town)	70	Nil
„	Nianga ...	60	Nil
„	Kass ...	40	Nil
„	Pallol ...	60	Nil
„	Kataba ...	50	Nil
„	Sukuta ...	70	Nil
„	Kayai ...	70	Nil
„	Mbayen ...	40	Nil
Nianija	Chamen ...	400	52
„	Konteh ...	70	Nil
„	Kayai ...	36	2
„	Buduk ...	70	6
Upper Saloum	N'Jau ...	400	180
„	Mbolgok ...	60	Nil
„	Bati Hai ...	60	8
„	Jamagen ...	60	12
„	Batinder (Fafa Sisi)	60	3
Lower Saloum	Ker Nderi ...	400	255
„	Jalato ...	140	46
„	Jahawur ...	60	7
„	Jane-kunda ...	132	51
NORTH BANK.			
Upper Baddibu	Illiassa ...	250	86
Central „	Salikene ...	323	114
Lower „	Kinte-kunda ...	630	120
Jokadu	Meme ...	200	30
Lower Niumi	Yessau ...	200	80
Upper „	Sika ...	200	15
UPPER RIVER.			
Fulladu East	Bassé ...	110	39
Wuli	Borro ...	221	142
Sandu	Diabugu ...	303	79
Kantora	Fattoto ...	1,125	117
	Totals	14,020	2,727

APPENDIX IV.

LIVESTOCK CENSUS
1933 AND 1937.

Province	Cattle		Goats		Sheep		Donkeys		Horses.	
	1933	1937	1933	1937	1933	1937	1933	1937	1933	1937
South Bank ...	9,794	15,557	27,044	20,277	12,440	10,440	882	805	53	49
North Bank ...	3,259	3,558	*(6,847) includes sheep.	9,118	recorded with goats.	2,267	394	486	66	44
MacCarthy Island ...	5,818	9,070	*(16,664) includes sheep.	12,256	do.	3,623	922	1,036	143	102
Upper River ...	6,496	8,791	*(17,396) includes sheep.	10,186	do.	3,875	2,703	2,259	366	326
Totals ...	25,367	36,976		51,837		20,205				
Increase or decrease in five years. ...		+11,609	x 80,391	72,042 — 8,349			4,901	5,086 +185	628	521 +107

* Sheep and Goat not recorded separately.
x Combined Goat and Sheep figures.

APPENDIX V.

COMPARATIVE TABLE OF GAMBIA CATTLE TYPES.

Item.	Gambian Shorthorn.	West African Shorthorn (Gambia Strain).	Hamitic (Gambia Strain).	Zebu (Senegal Strain.)
Approximate Liveweight	700 to 750 lbs.	600 to 700 lbs.	700 to 800 lbs.	800 to 1,000 lbs.
Predominating Colour	Fawn and light brown	Black; and black and white	Brown and red brown	Fawn, white and light brown.
Skin	Taut	Taut	Loose and folding	Very loose and folding.
Visible mucuous membranes	Amber	Black	Black	Amber
Hair	Short and close	Short and close	Short and fine	Short, medium to coarse.
Head	Medium to small	Medium	Coarse formation	Medium to long, coarse.
Forhead	Dished	Broad	Broad	Medium to narrow.
Horns	Incurved, upturned, clear amber colour	Incurved, black colour	Longish, less curved, more upright, black in colour	Long, upturned, wide.
Neck	Short	Short	Short and full	Medium to long, deep.
Dewlap	Short	Short	Loose and folding	Very loose and folding.
Barrel	Long, oblong to wedge conformation	Long, oblong	Long, oblong	Oblong, deep set.
Shoulders	Compact	Compact, small	Full and deep	Narrow, big bone.
Hump	Humpless	Humpless	Suspicion of hump	Large hump, rounded or fin shaped, narrow.
Back	Medium to broad	Medium to broad	Broad	Narrow
Ribs	Fairly well sprung	Well sprung	Well sprung	Deep.
Hips	Not prominent	Fairly prominent	Not prominent	Prominent.
Udder	Small and compact, well forward	Small and compact, well forward	Small and compact	Large, loose and inclined to bottle shape.
Navel	Obscure	Obscure	Obscure	Large and loose.
Meat	Medium to fine grain, light colour	Medium to fine grain, good colour	Medium grain, good colour	Medium to coarse grain, light colour.
Disease resistance	Trypanosomiasis	Trypanosomiasis	Trypanosomiasis	Rinderpest.
Susceptibility	Rinderpest	Rinderpest	Rinderpest	Trypanosomiasis.